

# Semantic Derivation

## Play+ Semantic Derivation Guide

### Overview

Semantic tokens are the heart of Play+'s theming model. They allow you to build visually rich and brand-flexible UI experiences by mapping global raw values to meaningful roles. This document explains how semantic tokens are derived, when to use them, when to avoid them, and how the Play+ theming engine operates.

### Token Architecture Summary

Tier	Token Type	Ownership	Usage Scope	Overridable?	Example
1	Global Tokens	Play+ Core	Raw values (e.g., colors, spacing)	(Do not override)	--global-color-pink-500
2	Semantic Tokens	User/Theme	Design roles (e.g., primary text)	Theme-specific	--color-brand-primary
3	Component Tokens	Advanced Usage	Component-specific overrides	Scoped	--component-button-padding-vertical

### How the Engine Runs

The Play+ Theming Engine loads when your application initializes or when a theme is switched at runtime. Here's how it operates:

- Loads the base CSS ( `_base.css` ) to get the global and default semantic tokens.
- Loads theme CSS files from the current brand/theme directory (e.g., `_enterprise.css` ).
- Applies mappings of semantic tokens → new global tokens via CSS custom properties.

- Applies derived states (e.g., hover, active, focus, dark variants) based on naming rules.
- Injects final token map into :root and watches for hot-swappable updates.

This engine ensures the entire application theme is controlled via lightweight CSS files, making live previews and runtime updates seamless.

## What Gets a Semantic Token (and What Doesn't)

Category	Needs Semantic Token?	Reason
Brand Colors		Changes between themes; context-aware.
Text Colors		Needs adaptive contrast.
Backgrounds		May shift in dark/light themes.
Typography (Fonts)		Brands may change body/heading fonts.
Motion Patterns		Shared Play+ motion language; not brand-specific.
Shadow/Elevation		Generally consistent across brands.
Radius	(Partial)	Use semantic token if branding requires it.
Icon Sizes		Functional sizes; unlikely to vary.
Accessibility Tokens		Used by accessibility-aware components.

## Token File Responsibilities

Path	Purpose
styles/tokens/_base.css	Contains all global (raw value) tokens and defines the CSS variables for semantic tokens with their base fallback values
styles/tokens/themes/_enterprise.css	Maps semantic tokens to new global values for a specific brand. The engine falls back to _default.css if no theme is loaded.

## Default Semantic Token List

This list comes from \_base.css and serves as the baseline for all themes:

### Colors

- --color-brand-primary
- --color-brand-secondary
- --color-brand-primary-hover
- --color-text-primary
- --color-text-secondary
- --color-text-disabled
- --color-text-on-brand
- --color-surface-interactive-default
- --color-surface-disabled
- --color-border-default
- --color-border-focus

### Typography

- --font-family-display
- --font-family-heading
- --font-body-1 , --font-body-2
- --font-heading-h1 , --font-heading-h2

### Motion

- --motion-pattern-fade
- --motion-pattern-slide

- --motion-pattern-pop

## Layout & Spacing

- --layout-max-width
- --layout-gutter-default

## Accessibility

- --accessibility-focus-ring-color
- --accessibility-focus-ring-style

## Iconography

- --icon-size-md
- --icon-size-lg

## Content

- --content-line-measure

## Glassmorphism

- --glass-backdrop-blur
- --glass-background-color

## Example Derivation Map (Default Theme)

Semantic Token	Mapped Global Token
--color-brand-primary	--global-color-pink-500
--color-brand-primary-hover	--global-color-pink-700
--color-brand-secondary	--global-color-purple-500
--color-text-primary	--global-color-gray-700
--color-text-secondary	--global-color-gray-600
--color-text-disabled	--global-color-gray-400
--color-text-on-brand	--global-color-white
--color-surface-interactive-default	--global-color-pink-500
--color-surface-disabled	--global-color-gray-200

Semantic Token	Mapped Global Token
--color-border-default	--global-color-gray-300
--color-border-focus	--global-color-pink-500
--font-family-display	--global-font-family-display
--font-family-heading	--global-font-family-heading
--font-family-body	--global-font-family-body
--motion-pattern-fade	--global-motion-duration-swift + easing
--layout-gutter-default	--global-spacing-4
--glass-backdrop-blur	12px

## Naming Convention Guidelines

Type	Prefix	Example
Color	color-	color-surface-disabled
Typography	font-	font-heading-h1
Radius	radius-	radius-md
Motion	motion-pattern-	motion-pattern-slide
Layout	layout-	layout-gutter-default
Icon	icon-	icon-size-md
Content	content-	content-line-measure
Accessibility	accessibility-	accessibility-focus-ring-width

## Best Practices

- Never use global tokens directly in components.
- Derive all design decisions through semantic tokens.
- Only use component-level tokens for scoped overrides or design exceptions.
- Document all brand themes via theme CSS files.
- Use fallback defaults to ensure graceful degradation.

## Theme Switching

Play+ supports runtime theming:

## Final Note

Semantic tokens are what make Play+ adaptable, accessible, and maintainable at scale. They are not an extra layer — they are the design language.